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APPARATUS TO AUTOMATICALLY DETERMINE A HAIR COLORING FORMULA IN ORDER TO OBTAIN THE DESIRED COLORING

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Means to input data such as a keyboard (20) are provided to supply to a microprocessor data processing unit data representative of the desired coloring and data as to condition, each of which is representative of the value of a parameter among a set of predetermined parameters characterizing the hair to be colored. The processing unit includes means to select the appropriate coloring formula as a function of the input data and on the basis of formulas stored in memory, and to command display of the formula on a display device (30).

Description

The invention concerns a device to automatically determine a hair coloring formula in order to obtain the desired coloring.

It is often difficult, even for an experienced specialist, to exactly and perfectly obtain the desired coloring and highlights in hair, whatever the characteristics of the hair to be colored.

Assistance in providing the coloring formula to be implemented using products of a predetermined line, in order to obtain the best possible desired result while taking into account the specific characteristics of the hair to be colored, is therefore desirable.

The precise aim of the invention is to provide an apparatus that would provide this assistance function automatically and reliably while being very easy to use.

This objective is achieved by means of an apparatus that, according to the invention, includes:

- a microprocessor data processing unit,

- at least one memory containing coloring formulas,

- means to input data to be supplied to the data processing unit that are representative of the desired coloring and data as to condition, each of which is representative of the value of a parameter from among a set of predetermined parameters, characterizing the hair to be colored, and

- a display device,

- the data processing unit including means to select a coloring formula as a function of the input data and to command display of the selected formula on the display device.

The parameters characterizing the hair to be colored include, in particular, the condition of the hair (that is, whether the hair is natural or dyed, with or without oxidation or bleaching), the value of the shade of the hair, highlights, root length, percentage of grey hair, and hair thickness. Other parameters may be taken into account to elaborate a more precise formula, such as, for example, the quality of the ends, whether or not there are streaks...

Question-and-answer means are preferably provided in order to obtain the input of data as to condition representative of the parameters in a certain order, in order to optimize the process of selecting the coloring formula.

According to one mode of embodiment of the apparatus according to the invention, the means to input data include a keyboard comprising keys, each of which corresponds to a specific value of a parameter. The keys are advantageously grouped in several sets, each of which corresponds to a parameter. Indicator means, lights for example, are linked to the sets of keys to indicate the parameter whose value is to be input in order for the data to be input in the proper sequence. Even further advantageously, the keys also constitute keys on an alphanumerical keyboard used, for example, to input data representative of the desired color and, if necessary, other information, such as data on the identity of the person whose hair is to be colored.

Other modes of embodiment of means to input data may also be used, such as selection means (keys or mouse) for data displayed on a screen under the command of a processing unit.

According to yet another advantageous feature of the apparatus according to the invention, the processing unit, memory, data input means, and the display device are grouped together in a single box. The box may also include a palette showing the different values that may be input for the value of the hair shade, which is one of the parameters of the hair to be colored.

The selected coloring formula is displayed, for example, by a printer that provides a printed ticket.

Thus, the apparatus according to the invention provides a reliable and easy to handle tool, one that is compact and easy to carry, which quickly supplies the coloring formula that is best suited to the problem posed.

The invention will be better understood upon reading the description given below with reference to the attached drawings, where:

- Figure 1 is a block diagram that very generally illustrates the structure of an apparatus according to the invention;

- Figure 2 is an overall view of a specific mode of embodiment of an apparatus according to the invention, showing in particular the keyboard of the apparatus; and

- Figure 3 is a flow chart illustrating the successive stages of an example of the coloring formula search process using the apparatus according to the invention.

The apparatus that is very schematically illustrated in Figure 1 includes microprocessor circuit 10, connected to which are keyboard 20, printer 30, and liquid crystal display 40.

Microprocessor circuit 10 conventionally includes processing unit 12, random access memory (RAM) circuits 14, read-only memory (ROM) circuits 16, and input/output circuits. In read-only memory circuits 16 are stored the programs needed to operate the apparatus as well as permanent data concerning, on the one hand, the set of products constituting the line of products from among which are chosen those used to implement the coloring formulas and, on the other hand, the set of coloring formulas, or more precisely, the set of types of coloring formulas.

One form of embodiment of the apparatus according to the invention is shown in greater detail in Figure 2.

Circuit 10, keyboard 20, printer 30, and display 40 are brought together in box 50.

Keyboard 20 takes up half of the upper surface of box 50. The keyboard includes keys 22, of the touch-key type, for example, designed to input data concerning, on the one hand, the desired coloring and, on the other, the values of a certain number of parameters that characterize the hair to be colored. Other data may be input, such as, for example, the name of the person whose hair is to be colored. In the example illustrated, most of the keys perform two functions; depending on the phase of the procedure in progress, they constitute either keys on an alphanumerical keyboard, or keys corresponding to different values attributed to different parameters used to characterize the hair to be colored.

The keys are distributed in several sets, each of which corresponds to a specific parameter. Thus, we find:
- a first set of four keys A to D that permit characterization of the condition of the hair: hair that has never been colored (A), colored by oxidation (B), colored without oxidation (C), bleached or lightened by more than four shades (D);
- a second set of three keys E to G that permit characterization of root length: more than 1 year (E), 1 year or less, (F), no roots (G);
- a third set of ten keys H to Q that permit characterization of the value of the shade of hair (either the value of the natural hair shade if the hair to be colored is natural, or the value of the colored or bleached hair shade if the hair to be colored is already colored or bleached): black (H), dark brown (I), medium brown (J), light brown (K), dark blond (L), medium blond (M), light blond (N), very light blond (O), white or platinum (P), red (Q);
- a fourth set of four keys R to U that permit characterization of the percentage of grey hair: less than 30% (R), from 30 to 50% (S), from 50 to 80% (T), and more than 80% (U);
- a fifth set of three keys V to X that permit characterization of the thickness of the hair: thick (V), medium (W), thin (X);

- a sixth set of two keys Y and Z that permit characterization of the quality of the ends: healthy and uniform (Y), porous and faded (Z);

- a seventh set of seven keys 0 to 6 that permit characterization of the highlights: natural or ash (0), golden (1), brown or chestnut (2), mahogany or dark purple (3), reddish copper (4), golden copper (5), olive or greenish (6); and

- an eighth set of three keys 7 to 9 that permit characterization of a specific situation: no streaks (7), streaks to be kept (8), streaks to be eliminated (9).

It will be noted that there is yet a ninth set of keys that make it possible to choose, if necessary, between a so-called "commercial" formula and a so-called "technical" formula, the second one giving a superior result as to quality but at a higher product cost and/or a longer lasting treatment.

Two keys, "return to the previous question," and "confirm" may be used during the question-and-answer process during which the various values of the parameters of the hair to be colored are input by activating the keys.

Finally, one key, "new diagnostic," turns on the apparatus and begins the coloring formula search process.

The various values of the parameters are preferably input in a specific sequence in order to optimize the search process. It is in this sequence that the different sets of keys will be described below. For purposes of respecting the order for the input of parameters, indicator means are provided to indicate to the user the parameter to be evaluated at each phase of the process. In the illustrated example, the indicator means are electroluminescent diodes, such as 24, linked to the keys corresponding to the parameter values. When the value of a parameter must be input, the diodes linked to the corresponding set of keys are illuminated; the choice of a value by hitting the corresponding key can then command the diode linked to that key to go out, which allows the user to visualize his or her choice before confirming it. It will be noted that two sets of diodes are linked to the keys for value of the hair shade: a first set being activated when the hair has previously been identified as natural and a second set being activated when the hair has previously been identified as colored or bleached.

The lighting of diodes 24 is controlled by the microprocessor circuit.

On the upper surface of box 50 one also sees display screen 40 and the output from printer 30.

Liquid crystal display 40 includes, for example, a screen with two lines of 20 characters capable of displaying the alphanumerical data input by means of the keys or messages generated by the processing unit and sent to the user during the coloring formula search process.

Printer 30 is of the thermal type, for example, capable of printing out the generated coloring formula onto a paper support, in the form of ticket 32 [sic; 35], for example, torn off a

roll. The ticket may possibly contain other information, such as the name of the person whose hair is to be colored and the date.

Finally, it is to be noted that along the front edge of the box is a palette of shades 52 in the form of colored locks 54 in the various values that may be attributed to the shade of the hair to be colored, in order to aid in evaluating this parameter.

Of course, a palette (not shown) is also provided the different hair colorings that may be provided by all the products of the line of products being considered. As was already stated, the information characterizing all the different coloring products are stored in the memory circuits of the apparatus. A reference number in the line and a specific numerical code are stored for each product, which code is determined, for example, by using:

- a first digit indicating the value of the coloring shade obtained by the product;
- a second digit possibly indicating the primary highlight;
- a third digit possibly indicating the secondary highlight;
- a fourth digit possibly indicating a the brilliance.

It is also possible to link to each product references to products that are distinguished from it by a difference of one shade darker or one shade lighter, in order to easily determine the proper coloring formula when, by virtue of the specific characteristics of the hair to be colored and/or of the coloring to be obtained, it may be necessary to use a product that is one shade lighter or one shade darker than what would normally correspond to the desired coloring.

The memory circuits will also contain a set of coloring formulas whose solution is generated by the processing unit as a function of the desired coloring and the input parameters. It may consist, in fact, of types of coloring formulas in which the reference number of the coloring product is not specified, the formula to be used being obtained by selecting the type of formula and then supplementing it with the reference number of the product that corresponds to the desired coloring (or in certain cases, of a product with a lighter shade or darker shade, as mentioned above).

The number of types of coloring formulas may be quite high: several hundred to cover the different possible situations when a choice is offered from among several tens of different colorings. For this reason, we will now proceed to give a few examples of modes of selecting formula types. It goes without saying that the invention does not reside in these different types of formulas. Their preparation is the within the scope of an expert in the field with expertise in the coloring products of a product line and in the values of the parameters that characterize the hair to be colored.

Example

Figure 3 illustrates an example of the formula selection process.

The first parameter to be evaluated is the condition of the hair. Figure 3 corresponds to a case where the hair to be colored is natural. The question-and-answer process advances in the above-mentioned order until the data on the various parameters have been input. The flow chart in Figure 3 includes the following stages:

- examination of the percentage of grey hair,

- for each value of the parameter "percentage of grey hair," calculate the value of the shade to be achieved, which is to say the difference between the shade of the hair to be colored and the shade that corresponds to the desired coloring;

- regardless of the percentage of grey hair, if the calculated value of the shade goes from shade after shade to 4 shades darker, and if the shade of the desired coloring is not a blond or red, formula type 1 is selected; if the calculated value of the shade is 5 shades darker or more, and if the shade of the desired coloring is not a blond or red, formula type 2 is selected; if the calculated value of the shade is one shade darker or more, and if the shade of the desired coloring is a blond, formula type 3 is selected;

- for a percentage of grey hair of less than 30%: if the value of the shade constitutes a lightening by 1 to 3 shades, and if the desired coloring is a shade that is not blond and does not have either natural nor ash highlights, formula type 4 is selected; if the value of the shade constitutes a lightening by 1 to 3 shades, and if the desired coloring has natural or ash highlights, formula type 5 is selected; if the value of the shade constitutes a lightening by 1 to 2 shades, and if the shade of the desired coloring is a blond, formula type 6 is selected; if the value of the shade constitutes a lightening by 4 shades, and if the desired coloring is a shade that is not blond and has neither natural nor ash highlights, formula type 7 is selected; if the value of the shade constitutes a lightening by 4 shades or more, and if the desired coloration has either natural or ash highlights, formula type 8 is selected; if the value of the shade constitutes a lightening by 3 to 4 shades, and if the desired coloring is a blond shade, formula type 9 is selected; if the value of the shade constitutes a lightening by 5 shades or more, and if the desired coloring is not a blond shade or a golden highlight with intense brilliancy, formula type 10 is selected; if the value of the shade constitutes a lightening by 5 shades or more, and if the desired coloring has golden highlights with intense brilliancy, formula 11 or formula 12 is selected depending on whether the option chosen is commercial or technical; if the value of the shade constitutes a lightening by 5 shades or more, and if the desired coloring is a blond shade, formula type 13 is selected; if the desired coloring is a red shade, formula 14 is selected;

- for a percentage of grey hair that ranges from 30 to 50%: if the value of the shade constitutes a lightening, and if the desired coloring is not a blond shade or a natural or ash highlight, formula

type 15 is selected; if the value of the shade constitutes a lightening, and if the desired coloring is a blond shade or a natural or ash highlight, formula type 16 is selected;

- for a percentage of grey hair ranging from 50 to 80%: if the value of the shade constitutes a lightening, and if the desired coloring is not a blond shade or a natural or ash highlight, formula type 17 is selected; if the value of the shade constitutes a lightening, and if the desired coloring is a blond shade or a natural or ash highlight, formula type 18 is selected.

By way of example, coloring formulas may be present in the following form:

Formula 1:

One tube of XXXX + 20 volumes "Oxigenta," dose for dose; waiting time = 30 minutes, XXXX being the reference number for a product corresponding to the desired coloring, the reference number for a product in a line of coloring being identical to the reference number under which the corresponding desired coloring is input by means of the keyboard. So, in this case, in order for a specific coloring formula to be printed out, one simply has to complete formula type 1 by inserting the reference number that identifies the desired coloring as it was input. "Oxigenta" is a hydrogen peroxide marketed under that name by the Schwarzkoff company, the co-applicant.

Formula 2:

pre-pigmentation with "Igofleur" dye xxx, 1 tube XXXX + 10 volumes "Oxigenta," dose for dose, waiting time, 30 minutes.

"Igofleur" designates a line of cationic dyes of the Schwarzkopf company. The choice of reference number xxx is made automatically as a function of the difference in shade value and the highlights of the desired coloring.

Formula 11 (commercial option):

1 tube of "G10" + 90 mL 30 volumes "Oxigenta", waiting time = 30 minutes.
The product "G10" is a specific product of the Schwarzkopf company, which results in a light blond shade with golden highlights.

Formula 12 (technical option):

bleach with bleaching cream + 30 volumes "Oxigenta" to the value of the chosen color, 1 tube XXXX + 10 volumes "Oxigenta," dose for dose, waiting time = 30 minutes.

Formula 15:

½ YYYY + ¼ NXXX + ¼ bleaching cream + 20 volumes "Oxigenta," dose for dose, waiting time = 30 minutes.

In this formula, as above, XXX identifies the product having the same shade as the desired coloring, NXXX indicating that from among the products of the same shade the one with natural highlights necessarily is added, while YYYY identifies a product having a darker shade than that of the desired coloring (the reference number for this product may easily be found if, in the file on the line of products stored in memory, each product is linked to the reference number of a product that is distinguished from it by a difference of one shade darker).

Formula 16:

bleaching by the product "B Blond" + 30 volumes "Oxigenta" two shades lighter than the chosen color; 1 tube XXXX + 10 volumes "Oxigenta," dose for dose, waiting time = 30 minutes.

In this formula, "B Blond" is a super-lightening product of the Schwarzkopf company.

The example given above constitutes a simplified procedure to the extent that neither the thickness of the hair nor the condition of the ends are taken into account.

Of course, similar procedures may be developed when coloring hair that is dyed by oxidation, lightening hair that is colored without oxidation, re-coloring bleached hair, or coloring a very light blond, platinum or white shade on hair that is already colored... For most procedures, the value of the parameter "length of roots" must be taken into account.

Finally, while the examples given refer to the products of a specific commercial line, it goes without saying that the invention may be implemented with products of another commercial line or of several different lines, an expert in the field being capable of determining the appropriate types of formulas needed to solve the different problems that arise in light of the specific characteristics of the coloring products available for use.

Claims

1. Apparatus to automatically determine a hair coloring formula in order to obtain the desired coloring, characterized in that it includes:

- a microprocessor data processing unit (10),
- at least one memory (16) containing coloring formulas,
- means to input data (20) to be supplied to the data processing unit that are representative of the desired coloring and data as to condition, each of which is representative of the value of a parameter from among a set of predetermined parameters, characterizing the hair to be colored, and
- a display device (30),
- the data processing unit including means to select a coloring formula as a function of the input data and to command display of the selected formula on the display device.

2. Apparatus according to Claim 1, characterized in that it includes question-and-answer means to request the input of data as to condition in a predetermined order.

3. Apparatus according to any one of Claims 1 and 2, characterized in that the means to input data include a keyboard (20) comprising keys, each of which corresponds to a specific value of said parameters.

4. Apparatus according to Claim 3, characterized in that said keys (22) are grouped into several sets, each of which corresponds to one of said parameters, and indicator means linked to the sets of keys to indicate the parameter whose value is to be input so as to provide the data as to condition to the processing unit in a predetermined order.

5. Apparatus according to any one of Claims 3 and 4, characterized in that said keys (22) also constitute keys on an alphanumerical keyboard.

6. Apparatus according to any one of Claims 1 to 5, characterized in that said parameters are chosen from among a set that includes, in particular, the condition of the hair, the value of the shade of hair, highlights, length of roots, percentage of grey hair, and thickness of the hair.

7. Apparatus according to any one of Claims 1 to 6, characterized in that the display device includes a printer (30) so as to be able to provide a coloring formula in printed form.

8. Apparatus according to any one of Claims 1 to 7, characterized in that the processing unit (10), memory (16), data input means (20), and the display device (30) are brought together in a single box (50).

9. Apparatus according to Claim 8, characterized in that it also includes a palette (52) showing the different values that may be input for the value of the shade of hair, which constitutes one of the above-mentioned parameters.
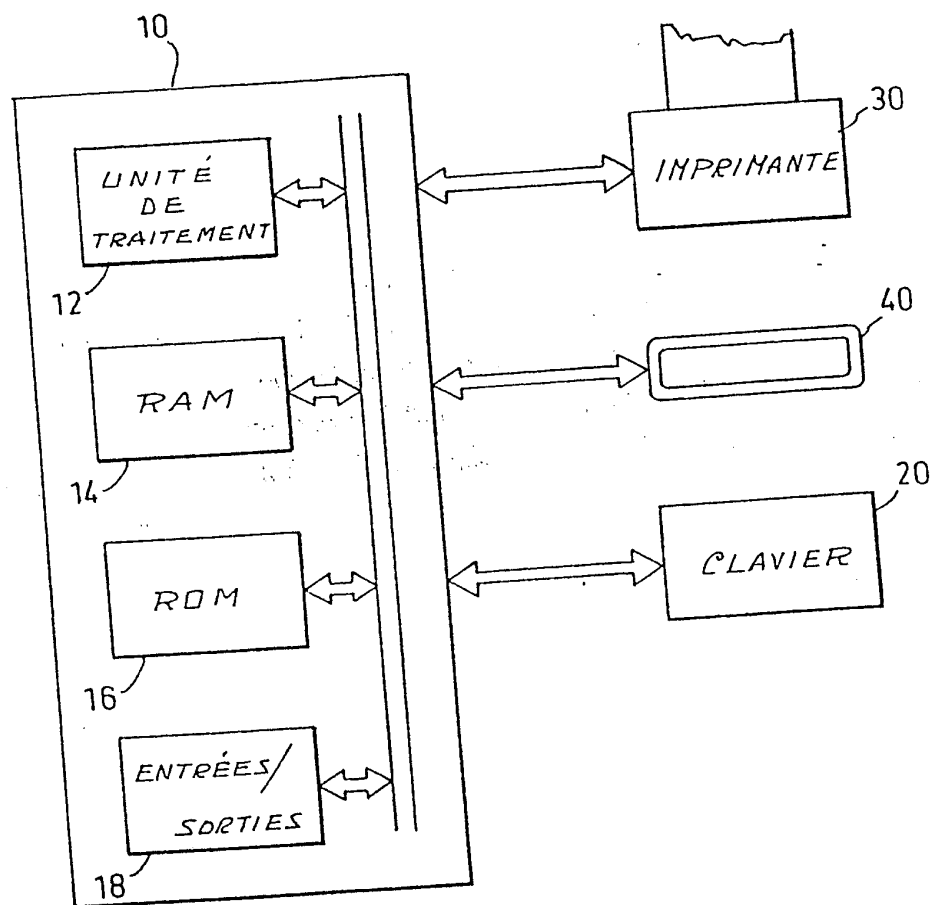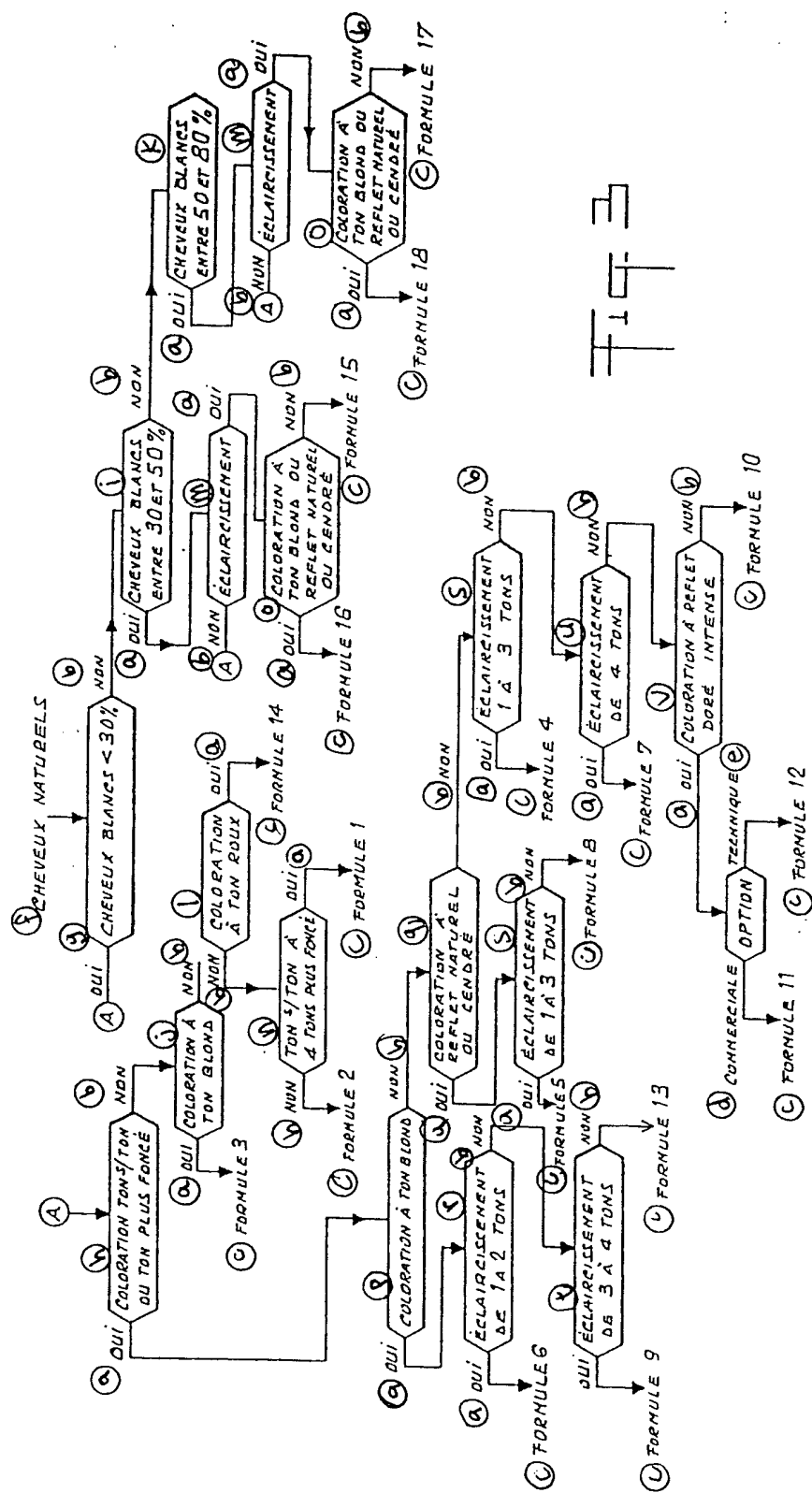
Figure 1

Key: 12   Processing Unit
      18   Input/output
      30   Printer
      20   Keyboard

Fig - 2

ORDINATEUR COLORATION

[Key to previous page]

a   New diagnostic
b   Condition of the hair
c   Root length
d   Value of the colored shade
e   Value of the natural shade
f   % Grey hair
g   Hair thickness
h   Condition of the ends
I   Highlights
j   Specific case
k   Coloring computer
l   Formula
m   Commercial
n   Technical
o   Return
p   Confirm
q   Black
r   Dark brown
s   Medium brown
t   Light brown
u   Dark blond
v   Medium blond
w   Light blond
x   Very light blond
y   Platinum
z   Red
35   Name: Mrs. Marchand
       Desired Color: B6
       Condensed diagnostic: BC2LRWYD
       Date:

CHEVEUX NATURELS

CHEVEUX BLANCS < 30% — OUI / NON

CHEVEUX BLANCS ENTRE 30 ET 50% — OUI / NON

CHEVEUX BLANCS ENTRE 50 ET 80% — OUI / NON

COLORATION TON-S/TON OU TON PLUS FONCÉ — OUI / NON

COLORATION À TON BLOND — OUI / NON
FORMULE 3

COLORATION À TON ROUX — OUI / NON
FORMULE 14

TON S/TON À TONS PLUS FONCÉ — OUI / NON
FORMULE 1
FORMULE 2

COLORATION À TON BLOND — OUI / NON

ÉCLAIRCISSEMENT DE 1 À 2 TONS — OUI / NON
FORMULE 6

ÉCLAIRCISSEMENT DE 3 À 4 TONS — OUI / NON
FORMULE 9

COLORATION À REFLET NATUREL OU CENDRÉ — OUI / NON

ÉCLAIRCISSEMENT DE 1 À 3 TONS — OUI / NON
FORMULE 5
FORMULE 13
FORMULE 8

ÉCLAIRCISSEMENT 1 À 3 TONS — OUI / NON
FORMULE 4

ÉCLAIRCISSEMENT DE 4 TONS — OUI / NON
FORMULE 7

COLORATION À REFLET DORÉ INTENSE — OUI / NON
FORMULE 10

OPTION COMMERCIALE / TECHNIQUE
FORMULE 11
FORMULE 12

ÉCLAIRCISSEMENT — OUI / NON
COLORATION À TON BLOND OU REFLET NATUREL OU CENDRÉ — OUI / NON
FORMULE 16
FORMULE 15

ÉCLAIRCISSEMENT — OUI / NON
COLORATION À TON BLOND OU REFLET NATUREL OU CENDRÉ — OUI / NON
FORMULE 17
FORMULE 18

Fig. 3

[Key to previous page]

a	Yes
b	No
c	Formula
d	Commercial
e	Technical
f	Natural hair
g	Grey hair < 30%
h	Coloring shade after shade one or more tones darker
i	Grey hair between 30 and 50%
j	Coloring to blond shade
k	Grey hair between 50 and 80%
l	Coloring to red shade
m	Lightening
n	Shade after shade 4 shades darker
o	Coloring to blond shade or natural or ash highlights
p	Coloring to blond shade
q	Coloring to natural or ash highlights
r	Lightening 1 to 2 shades
s	Lightening 1 to 3 shades
t	Lightening 3 to 4 shades
u	Lightening 4 shades
v	Coloring intense golden highlights

European
Patent Office

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.⁴)
X	PATENT ABSTRACTS OF JAPAN, vol. 2 no. 23 (E-77) February 15, 1978, page 11642 E 77; & JP-A-52 143 729 (TATEISHI DENKI K.K.) November 30, 1977 * Abstract *	1,2	G 06 F 15/02 A 45 D 44/00
A	US-A-4 160 271 (GRAYSON et al.) *column 2, lines 11-48*	1-4	
A	CH-A- 424 557 (L'OREAL) *page 1, lines 34-39*		
			TECHNICAL FIELDS SEARCHED (Int. Cl.⁴)
			G 06 F A 45 D

The present search report has been drawn up for all claims.

Place of search	Date of completion of the search	Examiner
The Hague	August 3, 1988	SONIUS M.E.

CATEGORY OF CITED DOCUMENTS

X: Particularly relevant if taken alone.
Y: Particularly relevant if combined with another document of the same category.
A: Technological background.
O: Non-written disclosure.
P: Intermediate document.

T: Theory or principle underlying the invention.
E: Earlier patent document, but published on, or after the filing date.
D: Document cited in the application.
L: Document cited for other reasons.

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&: Member of the same patent family, corresponding document.